इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS/QC 400200 (1992): Fixed Resistors for Use in Electronic Equipment Sectional Specification : Fixed Power Resistors [LITD 5: Semiconductor and Other Electronic Components and Devices]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS QC 400200 : 1992
IEC QC 400200 : 1982

भारतीय मानक

इलेक्ट्रानिकी उपस्कर में उपभोग के लिए जड़ित प्रतिरोधक

विषय विशिष्टि : जड़ित पावर प्रतिरोधकों के लिए

Indian Standard

FIXED RESISTORS FOR USE IN ELECTRONIC EQUIPMENT

SECTIONAL SPECIFICATION : FIXED POWER RESISTORS

UDC 621·316·8

© BIS 1992

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1992 *Price Rs* 60·00

IS QC 400200 : 1992
IEC QC 400200 : 1982

Indian Standard

FIXED RESISTORS FOR USE IN ELECTRONIC EQUIPMENT

SECTIONAL SPECIFICATION : FIXED POWER RESISTORS

NATIONAL FOREWORD

This Indian Standard, which is identical with IEC Pub 115-4/QC 400200 : 1982 'Fixed resistors for use in electronic equipment — Part 4 : Sectional specification : Fixed power resistors', issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Resistors Sectional Committee (LTD 14) and approval of the Electronics and Telecommunication Division Council.

The text of the IEC standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

> Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

In the adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IEC QC 400000 : 1982	IS QC 400000 : 1988 Fixed resistors for use in electronic equipment : Generic specification	Identical
IEC QC 001001 : 1981	IS QC 001001 : 1988 Basic rules of the IEC quality assessment system for electronic components (IECQ)	Identical
IEC QC 001002 : 1981	IS QC 001002 : 1988 Rules of procedure of the IEC quality assessment system for electronic components (IECQ)	Identical

The concerned technical committee has reviewed the provisions of IEC Pub 63, IEC Pub 68 and IEC Pub 410 referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard.

This standard is intended primarily for use under the IECQ System. A regular Indian Standard for this component could be different, identical or similar to this standard.

Only the English language text in the International Standard has been retained while adopting it as Indian Standard.

CONTENTS

Page

SECTION ONE — GENERAL

Clause

1. General 3
    1.1 Scope 3
    1.2 Object 3
    1.3 Related documents 3
    1.4 Information to be given in a detail specification 4

SECTION TWO — PREFERRED RATINGS, CHARACTERISTICS AND TEST SEVERITIES

2. Preferred ratings, characteristics and test severities 5
    2.1 Preferred characteristics 5
    2.2 Preferred values of ratings 6
    2.3 Preferred test severities 8

SECTION THREE — QUALITY ASSESSMENT PROCEDURES

3. Quality assessment procedures 9
    3.1 Structurally similar components 9
    3.2 Qualification approval 9
    3.3 Quality conformance inspection 14

SECTION ONE — GENERAL

1. General

1.1 *Scope*

This standard relates to fixed power resistors with rated dissipations greater than 1 W up to and including 1 000 W which are provided with a cover or coating for environmental protection.

1.2 *Object*

The object of this standard is to prescribe preferred ratings and characteristics and to select from I E C Publication 115-1 (1982), the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of resistor.

Test severities and requirements prescribed in detail specifications referring to this sectional specification shall be of equal or higher performance level, because lower performance levels are not permitted.

1.3 *Related documents*

I E C Publications

Publication 63 (1963):	Preferred Number Series for Resistors and Capacitors. Amendment No. 1 (1967). Amendment No. 2 (1977).
Publication 68:	Basic Environmental Testing Procedures.
Publication 115-1 (1982):	Fixed Resistors for Use in Electronic Equipment. Part 1: Generic Specification.
Publication 410 (1973):	Sampling Plans and Procedures for Inspection by Attributes.
Publication QC 001001 (1981):	Basic Rules of the I E C Quality Assessment System for Electronic Components (IECQ).
Publication QC 001002 (1981):	Rules of Procedure of the I E C Quality Assessment System for Electronic Components (IECQ).

Note. — The above references apply to the current editions except for I E C Publication 68 for which the referenced edition in the applicable test clauses of the generic specification shall be used.

1.4 *Information to be given in a detail specification*

Detail specifications shall be derived from the relevant blank detail specification.

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification.

When more severe requirements are included, they shall be listed in Sub-clause 1.8 of the detail specification and indicated in the test schedules, for example by an asterisk.

Note. — The information given in Sub-clauses 1.4.1 and 1.4.3 may, for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.4.1 *Outline drawing and dimensions*

There shall be an illustration of the resistor as an aid to easy recognition and for comparison of the resistor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions shall preferably be stated in millimetres, however when the original dimensions are given in inches, the converted metric dimensions in millimetres shall be added.

Normally the numerical values shall be given for the length of the body, the width and height of the body and the wire spacing, or for cylindrical types, the body diameter, and the length and diameter of the terminations. When necessary, for example when in a detail specification more than one dissipation value is covered, the dimensions and their associated tolerances shall be presented in tabular form below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the resistor. When the resistor is not designed for use on printed boards, this shall be clearly stated in the detail specification.

1.4.2 *Mounting*

The detail specification shall specify the method of mounting to be applied for normal use and for the application of the vibration and the bump or shock tests. The resistors shall be mounted by their normal means. The design of the resistor may be such that special mounting fixtures are required in its use. In this case, the detail specification shall describe the mounting fixtures and they shall be used in the application of the vibration and bump or shock tests.

1.4.3 *Style (I E C Publication 115-1, Sub-clause 2.2.3)*

For the purpose of this standard, the style is a combination of rated dissipation and temperature characteristic (or coefficient) of resistance.

It shall be represented by a double-letter code e.g. AB, BC, CD, etc., which is arbitrarily chosen for each dissipation/temperature characteristic combination covered by a detail specification. The style designation, therefore, has no meaning unless the number of the detail specification is also given.

1.4.4 *Ratings and characteristics*

The ratings and characteristics shall be in accordance with the relevant clauses of this specification together with the following:

1.4.4.1 *Rated resistance range*

See Sub-clause 2.2.1. The preferred values are those of the E-series of I E C Publication 63.

Note. — When products approved to the detail specification may have different ranges, the following statement should be added:
"The range of values available in each style is given in the qualified products list."

1.4.5 *Marking*

The detail specification shall specify the content of the marking on the resistor and on the package. Deviations from Sub-clause 2.4 of the Generic Specification, I E C Publication 115-1, shall be specifically stated.

SECTION TWO — PREFERRED RATINGS, CHARACTERISTICS AND TEST SEVERITIES

2. **Preferred ratings, characteristics and test severities**

2.1 *Preferred characteristics*

The values given in detail specifications shall preferably be selected from the following:

2.1.1 *Preferred climatic categories*

The resistors covered by this specification are classified into climatic categories according to the general rules given in I E C Publication 68-1.

The lower and upper category temperature and the duration of the damp heat, steady-state test shall be chosen from the following:

Lower category temperature:	−55 °C, −40 °C, −25 °C and −10 °C
Upper category temperature:	+125 °C, +155 °C and +200 °C
Duration of the damp heat, steady-state test:	4, 10, 21 and 56 days

The severities for the cold and dry heat tests are the lower and upper category temperatures respectively. Because of the construction of some resistors, these temperatures will occur between two of the preferred temperatures given in I E C Publication 68-2. In this event the nearest preferred temperature within the actual temperature range of the resistor shall be chosen for this severity.

2.1.2 *Temperature coefficients and temperature characteristics of resistance*

The preferred limits of change in resistance for the temperature characteristic of the resistance test are given in Table I.

Each line in the table gives the preferred temperature coefficient and corresponding temperature characteristic for 20 °C to 70 °C and limits of change in resistance for the measurement of the temperature characteristic of resistance (see I E C Publication 115-1, Sub-clause 4.8) on the basis of the category temperature ranges of Sub-clause 2.1.1 of this sectional specification.

TABLE I

Temperature coefficient	Temperature characteristic 20/70 °C	Temperature characteristic of resistance (limits of percentage change in resistance)						
		Reference temperature/ lower category temperature				Reference temperature/ upper category temperature		
(10^{-6}/°C)	(%)	+ 20/− 55	+ 20/− 40	+ 20/− 25	+ 20/− 10	+ 20/+ 125	+ 20/+ 155	+ 20/+ 200
± 500	± 2.5	± 3.75	± 3.0	± 2.25	± 1.5	± 5.25	± 6.75	± 9.0
± 250	± 1.25	± 1.88	± 1.5	± 1.13	± 0.75	± 2.62	± 3.38	± 4.5
− 50/ + 250	− 0.25/ + 1.25	− 0.375/ + 1.88	− 0.3/ + 1.5	− 0.23/ + 1.13	− 0.15/ + 0.75	− 0.525/ + 2.62	− 0.675/ + 3.38	− 0.9/ + 4.5
± 100	± 0.50	± 0.75	± 0.6	± 0.45	± 0.3	± 1.05	± 1.35	± 1.8
± 50	± 0.25	± 0.375	± 0.3	± 0.23	± 0.15	± 0.525	± 0.675	± 0.9
± 25	± 0.125	± 0.188	± 0.15	± 0.113	± 0.075	± 0.262	± 0.338	± 0.45
± 10	± 0.05	± 0.075	± 0.06	± 0.045	± 0.03	± 0.105	± 0.135	± 0.18

Note. — If measurements are required at additional temperatures, these shall be specified in the detail specification.

2.1.3 *Limits for change in resistance*

For each stability class, the preferred limits for change in resistance for each of the tests listed in the heading of Table II are as indicated.

Note. — The sub-clause numbers in the heading of Table II refer to I E C Publication 115-1.

TABLE II

Stability class in %	*Long-term tests* 4.23 Climatic sequence 4.24 Damp heat, steady state 4.25.2 Endurance at room temperature 4.25.3 Endurance at upper category temperature	*Short-term tests* 4.13 Overload 4.16 Robustness of terminations 4.18 Resistance to soldering heat 4.19 Rapid change of temperature 4.20 Bump 4.21 Shock 4.22 Vibration
5	± (5 % + 0.1 Ω)	± (1 % + 0.05 Ω)
2	± (2 % + 0.1 Ω)	± (0.5 % + 0.05 Ω)
1	± (1 % + 0.05 Ω)	± (0.25 % + 0.05 Ω)
0.5	± (0.5 % + 0.05 Ω)	± (0.1 % + 0.01 Ω)

2.2 *Preferred values of ratings*

2.2.1 *Rated resistance*

See I E C Publication 115-1, Sub-clause 2.2.7.

2.2.2 *Tolerances on rated resistance*

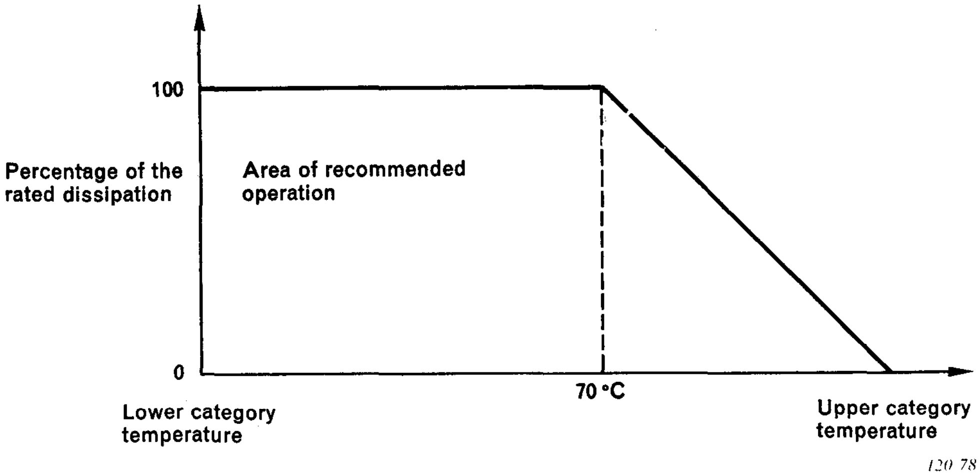
The preferred tolerances on rated resistance are: ±10 %, ±5 %, ±2 % and ±1 %.

2.2.3 *Rated dissipation*

The preferred values of rated dissipation, at 70 °C, are values from the R5 series of ISO Standard 3.

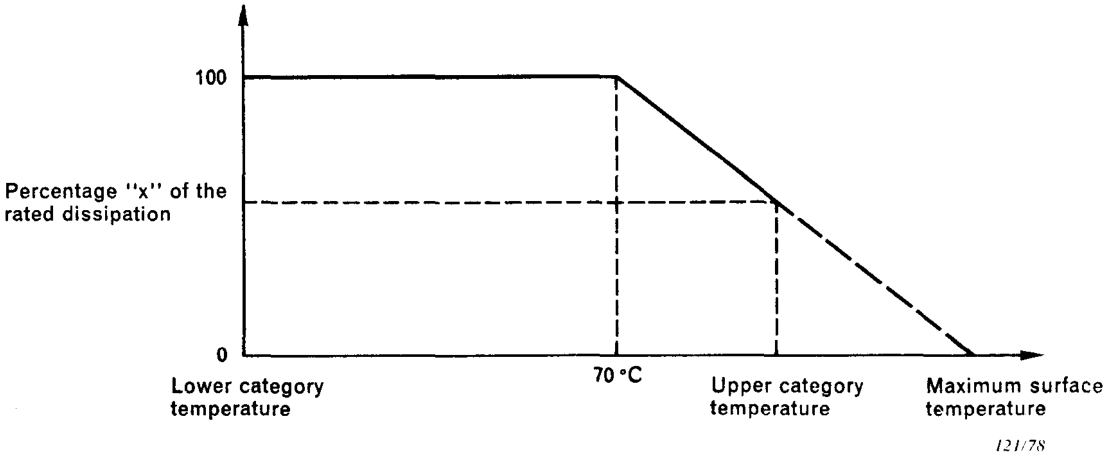
The detail specification shall prescribe the applicable value or range of values.

The derated values of dissipation at temperatures in excess of 70 °C shall be as indicated by the following curve:



A larger area of operation may be given in the detail specification provided it includes all the area given above. In this event, the detail specification shall state the maximum allowable dissipation at temperatures other than 70 °C. All break points on the curve shall be verified by test.

An example of a derating curve having a larger area of operation is given below. In the example, the maximum surface temperature (zero rating temperature) is higher than the upper category temperature.



2.2.4 *Limiting element voltage*

The preferred values of limiting element voltage in V d.c. or a.c. r.m.s. shall be chosen from the R5 series of ISO Standard 3.

2.2.5 *Insulation resistance (Only applicable for types with mounting devices and described as insulated)*

Unless otherwise specified in the detail specification, the insulation resistance shall be not less than 1 GΩ after dry heat tests and 100 MΩ after humidity tests.

2.2.6 *Isolation voltage (Insulated styles only)*

Unless otherwise specified in the detail specification, the isolation voltage shall never be less than the peak voltage that could be applied to the element; it shall, therefore, be not less than 1.42 times the limiting element voltage.

2.3 *Preferred test severities*

Test severities given in detail specifications shall preferably be selected from the following:

2.3.1 *Drying*

Procedure I of IEC Publication 115-1, Sub-clause 4.3 shall be used.

2.3.2 *Vibration*

Sub-clause 4.22 of IEC Publication 115-1, with the following details:

Frequency range:	10 Hz to 55 Hz or 10 Hz to 500 Hz
Amplitude:	0.75 mm or 98 m/s^2 (whichever is the less severe)
Sweep endurance:	Total duration: 6 h

The detail specification shall prescribe the mounting method to be used. For resistors with axial leads and intended to be mounted by the leads only, the distance between the body and the mounting point shall be 6 ± 1 mm.

2.3.3 *Low air pressure*

Sub-clause 4.23.5 of IEC Publication 115-1, with the following details:

Air pressure: 8.5 kPa (85 mbar)

2.3.4 *Overload*

Sub-clause 4.13 of IEC Publication 115-1, with the following details:

a) Wirewound resistors

The applied voltage shall be that required to dissipate 10 times the rated dissipation or 40 V per millimetre length of the resistor body, whichever is the less. The application time shall be 5 s, unless otherwise specified in the detail specification.

b) Non-wirewound resistors

Applied voltage:	2.5 times the rated voltage or twice the limiting element voltage, whichever is the less.
Duration of application:	specified in the detail specification.

2.3.5 *Robustness of the resistor body*

Sub-clause 4.15 of IEC Publication 115-1, with the following details:

Load: 100 ± 5 N

2.3.6 *Bump*

Sub-clause 4.20 of I E C Publication 115-1, with the following details:

Acceleration: 390 m/s^2
Total number of bumps: 4 000

The detail specification shall prescribe the mounting method to be used. For resistors with axial leads and intended to be mounted by the leads only, the distance between the body and the mounting point shall be 6 ± 1 mm.

2.3.7 *Shock*

Sub-clause 4.21 of I E C Publication 115-1, with the following details:

Acceleration: 490 m/s^2
Duration of pulse: 11 ms
Pulse shape: half-sine

The detail specification shall prescribe the mounting method to be used. For resistors with axial leads and intended to be mounted by the leads only, the distance between the body and the mounting point shall be 6 ± 1 mm.

SECTION THREE – QUALITY ASSESSMENT PROCEDURES

3. **Quality assessment procedures**

3.1 *Structurally Similar Components*

Resistors considered as being structurally similar are resistors produced with similar processes and materials, having the same nominal dimensions, but having different resistance values and temperature characteristics.

3.2 *Qualification Approval*

The procedures for Qualification Approval testing are given in Sub-clause 3.4 of the Generic Specification, I E C Publication 115-1.

The schedule to be used for Qualification Approval testing on the basis of lot-by-lot and periodic testing is given in Sub-clause 3.3 of this specification.

The procedure using a fixed sample size schedule is given in Sub-clause 3.2.1 and 3.2.2 below.

3.2.1 *Qualification Approval on the basis of the fixed sample size procedures*

Sampling

The fixed sample size procedure is described in I E C Publication 115-1, Sub-clause 3.4.2*b)*. The sample shall be representative of the range of values for which approval is sought. This may or may not be the complete range covered by the detail specification.

The sample shall consist of specimens having the highest and lowest resistance values for which approval is being sought. It should also include the specimens having the critical resistance value, if this is within the range being submitted. When approval is being sought for more than one temperature coefficient of resistance, the sample shall contain specimens representative of the different temperature coefficients. In a similar manner, the sample shall contain a proportion of specimens at the different resistance values having the closest tolerance for which approval is being sought. The proportion of specimens having the different characteristics shall be proposed by the manufacturer's Chief Inspector and shall be to the satisfaction of the National Supervising Inspectorate (N.S.I.).

Spare specimens are permitted as follows:

a) One per resistance value and one per each temperature coefficient or temperature characteristic value which may be used to replace the permitted defectives in Group "0".

b) One per resistance value and one per each temperature coefficient or temperature characteristic value which may be used to replace specimens which are defective because of incidents not attributable to the manufacturer.

When additional groups are introduced into the Qualification Approval test schedule, the number of specimens required for Group "0" shall be increased by the same number as that required for the additional groups.

3.2.2 *Tests*

The complete series of tests specified in Table III are required for the approval of resistors covered by one detail specification. The tests of each group shall be carried out in the given order.

The whole sample shall be subjected to the tests of Group "0" and then divided for the other groups. For insulated resistors the tests of Group 1 shall be made before the tests of Groups 2 to 7.

Specimens found defective during the tests of Group "0" shall not be used for the other groups.

"One defective" is counted when a resistor has not satisfied the whole or a part of the tests of a group.

The approval is granted when the number of defectives does not exceed the specified number of permissible defectives for each group or sub-group and the total number of permissible defectives.

Note. — In Table III the fixed sample size test schedule is given. It includes details of sampling and permissible defectives for different tests or groups of tests and gives, together with the details of test contained in Section Four of IEC Publication 115-1 and Section Two of this specification, a complete summary of test conditions and performance requirements.

It is indicated in Table III where, for the test methods, test conditions and/or performance requirements, a choice has to be made in the detail specification.

The conditions of test and the performance requirements for the fixed sample size test schedule shall be identical to those prescribed in the detail specification for quality conformance inspection.

TABLE III

Test schedule for Qualification Approval

Notes 1. — Clause numbers of test and performance requirements refer to the Generic Specification, IEC Publication 115-1, except for resistance change requirements, which have to be selected from Tables I and II of this specification, as appropriate.

2. — In this table:
n = sample size
c = group acceptance criterion (permitted number of defectives per group or sub-group)
t = total acceptance criterion (permitted number of defectives for one or several groups combined e.g. Group 0A + Group 0B or, Groups 1 to 7 inclusive)

D = destructive
ND = non-destructive

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size and criterion of acceptability (see Note 2)			Performance requirements (see Note 1)
			n	c	t	
Group 0A 4.4.1 Visual examination	ND		125	1	2	As in 4.4.1 Legible marking and as specified in the detail specification
Group 0B 4.4.2 Dimensions (gauging)	ND	A gauge-plate of ... mm shall be used (if applicable)	125	1		As specified in the detail specification
4.5 Resistance						As in 4.5.2
Group 1 4.7 Voltage proof (insulated resistors only)	ND	Method: ...	50	1	4	As in 4.7.3
Group 2 4.17 Solderability	D	Without ageing Method: ...	20	1		As in 4.17.3.2
4.13 Overload		See 2.3.4 of this specification Visual examination Resistance				As in 4.13.3 $\Delta R \leq \pm$ (... % R + ... Ω)
4.8 Variation of resistance with temperature		Lower category temperature/20 °C				$\frac{\Delta R}{R} \leq$ ... % or α: ... 10^{-6}/°C
		20 °C/upper category temperature				$\frac{\Delta R}{R} \leq$ ... % or α: ... 10^{-6}/°C
4.9 Reactance (if applicable)						$L/R \leq$ ... s or $L \leq$ ... mH
4.15 Robustness of the resistor body (if applicable)		See 2.3.5 of this specification				As in 4.15.3

(Table continued on page 25)

TABLE III *(continued)*

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size and criterion of acceptability (see Note 2)			Performance requirements (see Note 1)
			n	c	t	
Group 3A *Half of the sample of Group 3*	D		10	1*		
4.16 Robustness of terminations		Tensile, bending and torsion tests as appropriate to the type of termination Visual examination Resistance				As in 4.16.6*a)* $\Delta R \leq \pm$ (... % R + ... Ω)
4.18 Resistance to soldering heat		Method: ... Visual examination Resistance				As in 4.18.3 $\Delta R \leq \pm$ (... % R + ... Ω)
Group 3B *Other half of the sample of Group 3*	D		10	1*		
4.19 Rapid change of temperature		θ_A: Lower category temperature θ_B: Upper category temperature Visual examination Resistance				As in 4.19.3 $\Delta R \leq \pm$ (... % R + ... Ω)
4.20 Bump (or shock, see 4.21)		For mounting methods: see detail specification Number of bumps: 4 000 Acceleration: 390 m/s^2 Visual examination Resistance				As in 4.20.4 $\Delta R \leq \pm$ (... % R + ... Ω)
4.21 Shock (or bump, see 4.20)		For mounting methods: see detail specification Acceleration: 490 m/s^2 Duration of pulse: 11 ms Pulse shape: half-sine Visual examination Resistance				As in 4.21.5 $\Delta R \leq \pm$ (... % R + ... Ω)
4.22 Vibration		For mounting methods: see detail specification Procedure B4 Frequency range: ... Hz to ... Hz Amplitude 0.75 mm or 98 m/s^2, whichever is the less severe Total duration: 6 h Visual examination Resistance				As in 4.22.4 $\Delta R \pm$ (... % R + ... Ω)

* Total number of permissible defectives for Group 3 including Groups 3A and 3B shall not exceed 1.

(Table continued on page 27)

TABLE III *(continued)*

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size and criterion of acceptability (see Note 2)			Performance requirements (see Note 1)
			n	c	t	
Group 3 *All specimens of the sample of Group 3*	D		20	1*		
4.23 Climatic sequence – Dry heat – Damp heat, cyclic, Test Db, first cycle						
– Cold						
– Low air pressure		8.5 kPa (85 mbar)				
– Damp heat, cyclic, Test Db, remaining cycles						
– D.C. load (for non-wirewound types only)		Visual examination Resistance Insulation resistance (Insulated resistors only)				As in 4.23.8 $\Delta R \leqslant \pm (\ldots\ \%\ R + \ldots\ \Omega)$ $R \geqslant 100\ \mathrm{M\Omega}$
Group 4 4.25.2 Endurance at room temperature	D	Duration: 1 000 h Examination at 48 h, 500 h and 1 000 h: Visual examination Resistance Examination at 1 000 h: Insulation resistance (Insulated resistors only)	20	1		As in 4.25.2.6 $\Delta R \leqslant \pm (\ldots\ \%\ R + \ldots\ \Omega)$ $R \geqslant 1\ \mathrm{G\Omega}$
		If required by the detail specification the test shall be extended to 8 000 h Examination at 2 000 h, 4 000 h and 8 000 h: Resistance				$\Delta R \leqslant \pm (\ldots\ \%\ R + \ldots\ \Omega)$ The detail specification shall state the requirements (The results are obtained for information only)
Group 5 4.24 Damp heat, steady state	D	1) Sub-clause 4.24.2.1: 1st group 6 specimens 2nd group 7 specimens 3rd group 7 specimens 2) Sub-clause 4.24.2.2: 1st group 10 specimens 2nd group 10 specimens Visual examination Resistance Insulation resistance (Insulated resistors only)	20	1		As in 4.24.4 $\Delta R \leqslant \pm (\ldots\ \%\ R + \ldots\ \Omega)$ $R \geqslant 100\ \mathrm{M\Omega}$

* Total number of permissible defectives for Group 3 including Groups 3A and 3B shall not exceed 1.

(Table continued on page 29)

TABLE III *(continued)*

Sub-clause number and Test (see Note 1)	D or ND	Conditions of tests (see Note 1)	Sample size and criterion of acceptability (see Note 2)			Performance requirements (see Note 1)
			n	c	t	
Group 6	D		20	1		
4.4.3 Dimensions (detail)						As specified in the detail specification
4.25.3 Endurance at upper category temperature		Duration: 1 000 h Examination at 48 h, 500 h and 1 000 h: Visual examination Resistance Examination at 1 000 h: Insulation resistance (Insulated resistors only)				As in 4.25.3.7 $\Delta R \leq \pm (\ldots \% R + \ldots \Omega)$ $R \geq 1$ GΩ
Group 7	D		20	1		
4.25 Endurance at other temperatures (if applicable)		(This group is only applicable if a derating curve other than those shown in this sectional specification is claimed in the detail specification) Duration: 1 000 h Examination at 48 h, 500 h and 1 000 h: Visual examination Resistance Examination at 1 000 h: Insulation resistance (insulated resistors only)				As in 4.25.1.7 $\Delta R \leq \pm (\ldots \% R + \ldots \Omega)$ (As for Group 4) $R \geq 1$ GΩ

3.3 *Quality Conformance Inspection*

3.3.1 *Formation of inspection lots*

An inspection lot shall consist of structurally similar resistors (see Sub-clause 3.1) of the same style. It shall be representative of those extremes of the resistance range produced during the inspection period. Styles having the same nominal dimensions but different temperature characteristics of resistance which are produced during the period may be aggregated, except for the purposes of sub-groups which contain a test for temperature characteristic of resistance. The low and high extreme values, or any critical value of the ranges of resistance and temperature characteristics of resistance, for which Qualification Approval has been granted shall be inspected during a period which is approved by the National Supervising Inspectorate (see note).

The sample for Groups "C" and "D" shall be collected over the last 13 weeks of the inspection period.

Note. — "Low" extreme values shall be between 0 % and 200 % of the current lowest approved resistance value (or lowest value manufactured within the approval range).
"High" extreme values shall be between –30 % and 0 % of the current highest approved resistance value (or highest value produced within the approval range).
"Critical" values shall be between –20 % and 0 % of the calculated value.

3.3.2 *Test schedule*

The schedule for the lot-by-lot and periodic tests for Quality Conformance Inspection is given in Section Two, Table II of the Blank Detail Specification IEC Publication 115-4-1.

3.3.3 *Assessment levels*

The assessment level(s) given in the blank detail specification shall preferably be selected from Tables IV A and IV B:

TABLE IV A

Inspection sub-group**	D*		E		F*		G*	
	IL	AQL (%)	IL	AQL (%)	IL	AQL (%)	IL	AQL (%)
A1			S-4	1.0				
A2			S-4	1.0				
B1			S-3	1.0				
B2			S-3	2.5				
B3			S-3	2.5				

IL = inspection level
AQL = acceptable quality level

TABLE IV B

Inspection sub-group**	D*			E			F*			G*		
	p	n	c	p	n	c	p	n	c	p	n	c
C1				3	20	1						
C2				3	20	1						
C3				3	20	1						
D1				12	20	1						
D2				36	13	1						
D3				36	20	1						
D4				36	20	1						
D5				36	13	1						

p = periodicity in months
n = sample size
c = permitted number of defectives

Notes concerning Tables IV A and IV B:

* The assessment levels D, F and G are under consideration.

** The content of the Inspection sub-groups is described in Section Two of the relevant blank detail specification.

Printed at Dee Kay Printers, New Delhi, India